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MACHINING EVOLUTION

A Western Pennsylvania supplier turns toward several new turning machines for the production of oil and gas components.



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MACHINING EVOLUTION

Edited by Matthew T. Grasson, Senior Editor

A Western Pennsylvania supplier turns toward several new turning machines for the production of oil and gas components.

For centuries, Western Pennsylvania has hosted pioneering energy initiatives. In the late 1700s, settlers mined coal near Pittsburgh, Pa. In 1859, the first commercial oil-specific well was drilled near Titusville, Pa. In 1958, the first full-scale pressurized water reactor commercial nuclear power plant was commissioned in Shippingport, Pa. Pennsylvania coal today supports power generation and steel-making as local companies design and manufacture components for military and civilian nuclear power generation. Most recently, new drilling methods including hydraulic fracturing are driving explosive growth in gas production from the Marcellus Shale geologic formation. The gas is so abundant that Shell Oil Co. has pledged to build a multi-billion dollar ethane cracker plant in Beaver County, Pa. According to The New York Times, local congressional representative, Keith Rothfus calls his district "America's new energy capital."

Davan Manufacturing Inc., Washing-

ton, Pa, is a machining services provider that is evolving to meet the growing demand for energy-related components. Mark Vanistendael's father, David, found the company in the 1960s to make sheet metal parts and fastening hardware for the electronics industry. The shop continually sought out the most current manufacturing technology, beginning with screw machines and then acquiring early NC and CNC equipment in the late 1970s. As electronics production moved overseas, the shop shifted its focus to making larger parts for glassmaking, steel, and mining customers. Mark, who is now company owner and president, has continued to strengthen the company through further diversification to include aerospace and medically related parts. Davan now serves 30 to 40 customers in a dozen different industries.

"Our work has evolved from smaller parts that you can hold in the palm of your hand to those we need a crane to lift," Mark says.

Although the shop processes many

parts that are much larger than fasteners it made initially, it still machines smaller components.

"We work hand in glove with some of the bigger shops that do not want to mess around with small precision parts. We complement those shops. That has allowed us to take the small end of the market, handling short to medium volume production for the steel, oil exploration, power, glass, mining, valve, and construction industries that require high quality interchangeable parts at competitive prices with dependable deliveries."

Davan updates its manufacturing technology in response to its customers' needs.

"We have evolved over the years from single task machines to multi task machines," Mark says. Conventional horizontal lathes followed the screw machines, "then we started moving towards sub spindles and live tools, and now all of our turning centers are live mill turn centers. All but one of our milling machines are pallet machines with large tool changers and through spindle coolant."

The shop has employed CAD technology for 15 years, and it is moving into solid modeling of some parts to speed its processing on mill turn centers.

As business grew for prismatic alu-



LEFT: Because the You Ji VTL 800-ATC+C is a ram-style machine, it offers a clear view of possible tool interferences during programming of machining operations. **ABOVE:** At 31,000 lb and with a 100" x 136" x 160" footprint, the You Ji VTL 800-ATC+C represents a solid platform for machining energy-related components at Davan Manufacturing.

minum parts requiring high speed machining, "we started moving away from vertical milling machines to horizontals, because on a horizontal you can rotate the part to get all faces of it. We just were not competitive when we had to run those parts through a turning center, then a vertical mill, then index them on an indexer," Mark says.

The horizontal machines also reduced part handling, enabling Davan to produce parts for its customers faster and at the same time strengthen profitability.

Surging demand for larger fluid handling parts used in oil and gas production led the shop to new vertical turning machines. "We were looking at energy-related flange-type work. A vertical machine does not need a tailstock, and gravity helps hold the work into the chuck," Mark says. "A lot of those parts were difficult to load with a conventional crane on the horizontal lathe."

He adds that a vertical lathe also consumes less floor space than a horizontal configuration, and space in the expanding shop was at a premium.

After thoroughly researching the wide selection of vertical turning machines available, Davan bought a You Ji YV-500E VTC from Absolute Machine Tools Inc., Lorain, Ohio. The machine's standard cutting diameter is 500mm, and it features a 10-tool turret with block-type toolholders. The 30hp high torque FANUC motor provides more torque at lower rpm than a FANUC single-wound 50hp motor, coupled with a ZF gearbox, made the machine capable of heavy-duty machining as well as finishing operations.

To handle continuing growth in the size and volume of parts for the oil and gas market, Davan recently added another You Ji vertical. The VTL-800ATC+C is equipped with a ZF gearbox and 50hp high-torque FANUC motor. Tools are presented to the workpiece via a rigid 7.1" x 7.1" square vertical steel ram. An automatic tool changer holds 16 50-taper size tools. The machine also features a C-axis with two 2,400rpm, 15hp motors and a two-speed gearbox.

"We did not have a turning center that would turn parts as large as our

largest mill could take," Mark says, "With its 800mm cutting diameter, the new machine gives us the next range in size up from what we had previously."

The fixed rail or ram configuration was a plus for the larger work the shop now handles.

"My shop team really kind of pushed me towards the ram style machine because when they are programming they can see all the tool interferences firsthand. In addition, we like the rigidity of the ram. We were looking at drilling big 2" diameter holes and we wanted to run real milling tools, real shell mills," Mark continues. "There is really nothing that competes with a ram style machine in an 800mm range with a big 50 taper milling package. We were looking to replace our old milling machine and our vertical turning center, and we found that this machine was a hybrid of both."

A good example of an energy-related part typically processed on the vertical lathe is a well component known as a rotating control head. The device functions as a seal to permit drilling with the well under pressure. Mounted on top of

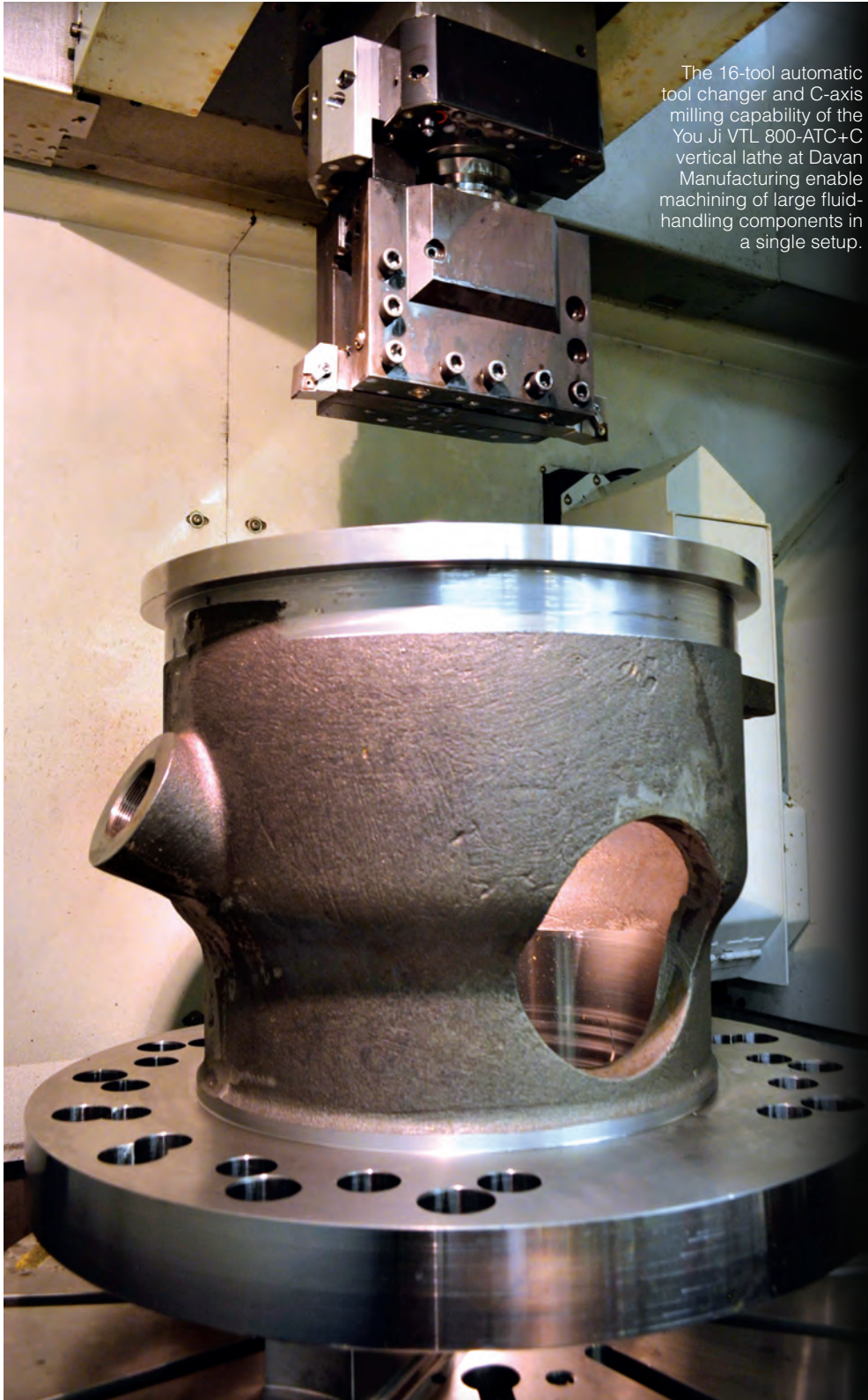
machining

the well's blowout preventer, the head consists of a heavy-duty housing containing a bearing assembly with sealing elements that rotate with the drill string and divert flow around the drill pipe.

The steel bowl element can weigh as

much as 500 lb.

Before acquiring the new VTL, Mark says, "Most of those parts needed to leave the lathe and go on a mill for milling work and drilling of large holes. We have been able to put heavy-duty live



The 16-tool automatic tool changer and C-axis milling capability of the You Ji VTL 800-ATC+C vertical lathe at Davan Manufacturing enable machining of large fluid-handling components in a single setup.



ABOVE: Mark Vanistendael, owner/president, Davan Manufacturing, says ongoing efforts to achieve lean machining objectives put the shop in a constant state of change. **RIGHT:** Large flanged parts are typical of the energy-related components machined on vertical lathes at Davan Manufacturing.

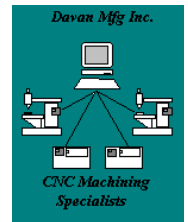
milling tools on the new machine and do everything in one operation. Instead of chucking the part four times, we can do it in one or two setups. We do not need to go through all that extra handling to do the same thing. The bottom line is if it saves you handling, it saves you money. Turnaround ends up being better and we can get that part done in less setups."

Boosting machining efficiency is a continuous and multi-faceted effort. Mark says, "The shop seems like it is always in some state of change where we are trying to reduce the number of steps it takes to get something done, consolidating our tools, consolidating our workspace, and working the best we can by creating cells. Right now, we are working to wire all the machines direct to a DNC system so that we can upload and download programs while the operator stays at the machine, and that way is a little bit leaner as far as setup times go. In addition, we are figuring out



probably going to see in the next 15 to 20 years, so we are trying to position ourselves in a place in that supply line. I think you will see more manufacturers set up shop in this area to build this type of equipment and they will look to locally source their product.”

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how to reduce the number of times we touch a part, from when we saw up the bar stock till it goes out the door. Lean is the big buzzword in the management world. I can see where it pays even in non-manufacturing areas. One of our top priorities is to really learn lean, so that the people on the floor know it and participate in it.”

Serving Western Pennsylvania’s energy boom presents Davan Manufacturing with both opportunities and challenges.

“Because we are in the epicenter of coal, oil, gas, and nuclear, we are looking to grow in the energy business,” Mark states. “And once this Shell plant goes in, it is going to open up a whole lot of doors as far as manufacturing product for the refining process and chemical processing.

“The energy market is evolving from raw drilling, to pipeline work, to processing,” he says. “That is the trend we are



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